INTERNATIONAL MARITIME ORGANIZATION

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WORKING GROUP ON REDUCTION OF
GHG EMISSIONS FROM SHIPS
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DEVELOPMENT OF A PROGRAMME OF FOLLOW-UP ACTIONS OF THE INITIAL IMO STRATEGY ON REDUCTION OF GHG EMISSIONS FROM SHIPS

The regulation of ship operational speed: an immediate GHG reduction measure to deliver the IMO 2030 target

Submitted by CSC

SUMMARY

Executive summary:	In this submission CSC describes and proposes one approach to regulating ship operational speed and offers this as a contribution to the discussions around the use of ship speed to meet the goals of IMO's GHG Strategy. The approach involves exempting some ships and setting the maximum average ship speeds per annum differentiated by ship type and size. In the first instance this could involve capping speeds at the level of the baseline, with subsequent reductions designed to help IMO meet its 2030 carbon intensity target while avoiding any negative impacts.
Strategic direction, if applicable:	3
Output:	3.2
Action to be taken:	Paragraph 26
Related documents:	None

Introduction

1 MEPC 72 in April 2018 agreed on an Initial GHG Strategy to address shipping's climate impact. As part of the Strategy IMO committed, inter alia, to reduce the carbon intensity of international shipping, that is to reduce "CO_2 emissions per transport work, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050, compared to 2008".

2 In order to achieve the required reductions in carbon intensity and absolute emissions, the Initial GHG Strategy includes a list of candidate measures to achieve emission reductions over different time horizons. The list of short-term measures includes, inter alia, operational "speed optimization and speed reduction" as an emissions reduction measure that the Organization should consider to implement.

3 The Initial GHG Strategy also contains the commitment that "in aiming for early action, the timeline for short-term measures should prioritize potential early measures that the Organization could develop, while recognizing those already adopted, including MARPOL Annex VI requirements relevant for climate change, with a view to achieve further reduction of GHG emissions from international shipping before 2023".

4 Taking this into account, CSC proposes that IMO prioritizes the development of speed optimization and speed reduction as an immediate emissions reduction measure in order to ensure that international shipping meets IMO's 2030 carbon intensity reduction commitment of -40% compared to 2008 levels.

5 In the proposal below, CSC describes one possible approach to the regulation of ship speed and offers this as a contribution to the discussions around the use of ship speed to meet the goals of the IMO's GHG Strategy.

Proposal

6 This proposal introduces the concept of mandatory maximum operational speeds, per ship type and size, for ships engaged in international voyages. Maximum speeds, as detailed below, could come into effect in 2021/2022. Maximum operational speeds could be capped at the level of the baseline in the first year of implementation, and then progressively reduced in the period up to 2030. The levels and timing could be determined by the IMO in order to give the industry fair warning and time to adjust. The maximum speeds should be set at the levels that will help the sector to meet the 2030 carbon intensity target of -40% below 2008 levels, while taking into account operational safety, the optimum speed principle detailed in paragraph 22 below, and impacts on States as appropriate.

Regulatory pathways under MARPOL Annex VI

7 Speed optimization and speed reduction, for the purpose of this proposal, means applying regulatory ceilings to operational ship speed(s) based either on maximum absolute speeds (as with road vehicles) or maximum average speeds per year. Further technical explanation of terminologies can be found in paragraphs 22 to 25 below. There appear to be two main regulatory pathways to implement a system of mandatory maximum operational ship speeds:

.1 Regulation of operational speed only - This pathway provides a relatively simple and straightforward way to implement and enforce maximum operational ship speeds. It can be designed in a way to provide flexibility for ships to choose different operational speeds over the course of a year (see paragraphs 8.2, 9, and 18 to 21 below).

.2 Regulation of operational speed with alternative compliance mechanisms - This is more of a goal-based approach to regulating shipping emissions and provides flexibility to shipowners/operators to choose their preferred method of compliance with the set goal. Alternative compliance mechanisms could include, inter alia, improvement of operational efficiency through retrofitting or a contribution to an independent R&D fund mechanism. The implementation of this option will necessitate the development of additional regulatory mechanisms, operational efficiency metrics and guidelines.

8 While CSC would not object if MEPC decided to explore the approach described in paragraph 7.2, the current proposal considers the regulation of operational speed only as outlined in paragraph 7.1. A decision also needs to be taken as to whether the regulation is going to apply to maximum absolute speeds or maximum average speeds:

.1 Maximum absolute speed - ships are required to keep their maximum operational speed at any point in time below a predefined value similar to road speed limits; and

.2 Maximum average speed - ships are required to keep their average operational speed below a predefined maximum value either per voyage (i.e. between consecutive port calls) or per year (i.e. over the course of a calendar year).

9 CSC considers that regulation of maximum average operational speeds on an annual basis would be the most straightforward and practical approach, as it combines environmental benefits, practical flexibility for shipowners, and relative ease of compliance and enforcement for the responsible authorities. Under this option individual ships would be able to vary their operational speed over the course of the year, while making sure that their annual average speed remains below a pre-defined ceiling. Paragraphs 11 to 13 and 18 to 21 below provide further detail on the practical implementation and enforcement of this approach.

10 Following the collection of bottom-up operational data under the Data Collection System (DCS), IMO may decide to establish operational efficiency metric(s) to measure and regulate the operational carbon intensity of international shipping, as well as of individual ships. In that case, IMO could consider revising the speed regulation in order to allow for ships to comply with the speed regulation through alternative compliance mechanism(s) as detailed in paragraph 7.2.

Baselines and target maximum speeds

11 Direct regulation of operational speed requires the determination of baseline speeds. Given that different ship types and sizes have varying average operational speeds, application of a single uniform maximum speed to all ships could present problems. Therefore, different speed baselines and target maximum speeds need to be determined for different ship type and size categories.

12 Baseline speeds could be set on the basis of the average historical operational speeds of each covered ship type and size using historical AIS data. Once the baseline speeds are set, target maximum speeds could be arrived at by applying a percentage (%) reduction, to be determined following an impact assessment, below the baseline per covered ship type and size category. Table 1 below provides an example for baselines on the basis of the average 2015 speeds and speed thresholds per ship type/size.

13 In practical terms, ship average speeds that will be made available under the IMO DCS (see paragraph 18) can be used to verify/optimize the baseline speeds currently available through AIS. IMO could consider setting a historical baseline per ship type/size (e.g. as average 2015 speeds) based on AIS and analyse the correlation between AIS and DCS in 2020 when the first annual bottom-up data will be available. If any deviation is identified between 2020 AIS and DCS, then 2015 baseline speeds can be adjusted on the basis of 2020 AIS-DCS correction factor.

Table 1: example of maximum operational speeds (-10%) per ship type and size
(source: ICCT, 2017)

Ship Class	Size category	unit	2015 CO_2 (tonnes)	Baseline: Average 2015 speed (knots)	Example maximum speeds in knots (-10% below 2015 baseline)
Container	1,000-2,000	TEU	27,214,751	**13.60**	*12.24*
	2,000-3,000		20,230,592	**13.95**	*12.56*
	3,000-5,000		43,873,447	**14.80**	*13.32*
	5,000-8,000		40,864,772	**15.44**	*13.90*
	8,000-12,000		42,154,615	**15.73**	*14.16*
	12,000-14,500		16,736,899	**15.89**	*14.30*
	>14,500		7,869,424	**16.86**	*15.17*
Bulk carrier	10,000-35,000	DWT	19,682,329	**11.36**	*10.22*
	35,000-60,000		43,578,730	**11.56**	*10.40*
	60,000-100,000		53,102,931	**11.56**	*10.40*
	100,000-200,000		36,394,686	**11.07**	*9.96*
	>200,000		17,961,857	**11.82**	*10.64*

Scope of regulation: ship types and sizes

14 In order to ensure that the measure is effective and proportionate at the same time, it might be sensible to introduce target maximum speeds only for a subset of ship types and sizes. To reduce the administrative burden while ensuring a high environmental impact, the measure could aim for a high coverage of emissions with a minimum number of ships regulated. Hence, consideration could be given to exclude from the scope of the speed regulation the ship type/size categories that include many individual ships but are responsible for only a small fraction of total GHG emissions.

15 In the example illustrated in figure 1 below, the largest ship types and sizes (containers, bulkers, tankers, general cargo ships, liquid gas carriers and cruise ships) account for less than 30% of the global fleet in terms of number of ships but emit 75% of total shipping GHG. They are mostly engaged in the deep sea trades. The remaining 70,000 and above smaller ships, which are mostly involved in short sea coastal shipping, are responsible for only a quarter of shipping GHG emissions.

16 Such a breakdown provides a good opportunity for effective regulation of the operational speeds of the largest ships to achieve substantial environmental benefits while avoiding any disproportionate impact on smaller ships by exempting them from the regulatory scope.

17 Therefore, IMO could consider, following an impact assessment, applying speed regulation to, for example, containerships (>1,000 TEU), bulkers (>10,000 dwt), oil and chemical tankers (>5,000 dwt), liquid gas carriers, general cargo ships (>5,000 dwt) and cruise ships (>2,000 GT), while exempting other ships, including passenger ferries. Some of the largest ships of other types, especially those carrying cargo and having relatively high cruising speeds, could also be considered for inclusion, but this would need further data analysis. Specialized reefer vessels (<800 vessels in total) could normally be excluded as well (see paragraphs 19 to 21).

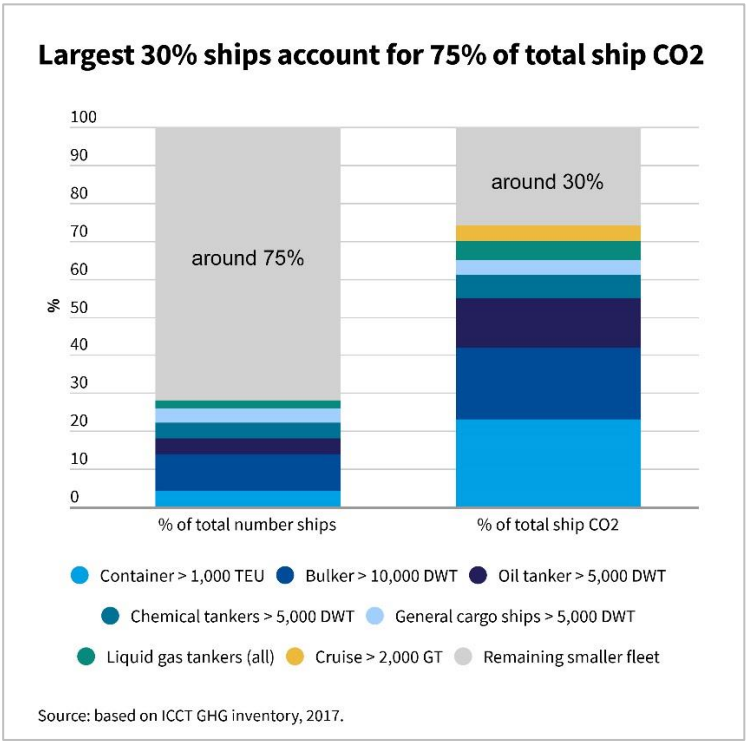

Figure 1: the ship types/size accounting for the highest emissions

Compliance and enforcement

18 The IMO Data Collection System (DCS) requires ships to report to their flag States certain data related to their operations in each preceding calendar year. This reporting obligation includes, inter alia, cumulative hours under way and total distance sailed over the course of the reporting year. These reporting obligations under the DCS would be sufficient to implement and enforce maximum average speeds per year, as flag States can use them to certify compliance with maximum speeds as a function of distance over time (V=D/T).

Perishable fresh fruit exports

19 Fresh fruits can be exported in specialized reefer vessels or in reefer containers in normal containerships. In 2015, there were fewer than 800 specialized reefer ships active in global maritime trade, accounting for less than 1.6% of ship CO_2 (ISWG-GHG 2/4/1). In order to minimize any possible impact of speed regulation on the products carried by these ships, consideration could be given to exempt specialized reefer vessels from any speed regulation.

20 When it comes to reefer containers on containerships, the most straightforward way to implement speed management would be the maximum average speed on a per annum basis as suggested in this proposal. This would mean that ships could maintain current speeds in certain months (i.e. fresh fruit export seasons), while slowing down during other months to ensure annual average speed remains below their allowed maximum level.

21 For example, according to Chile et al. (ISWG-GHG 3/2/10), the main cherry export months from Chile are October through February, i.e. five months a year. This would mean that a container ship carrying Chilean cherries in its reefer containers would be able to maintain current speeds during the cherry export seasons and slow down during the other months to comply with annual average maximum speeds (see figures 2 and 3). This possible solution needs to be further impact assessed.

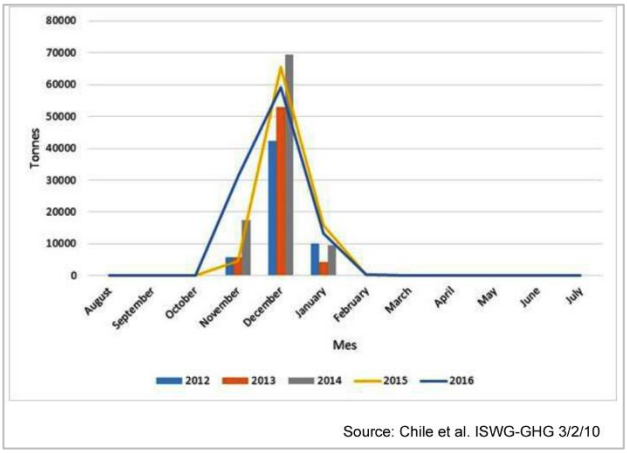

Figure 2: Chilean cherry export months

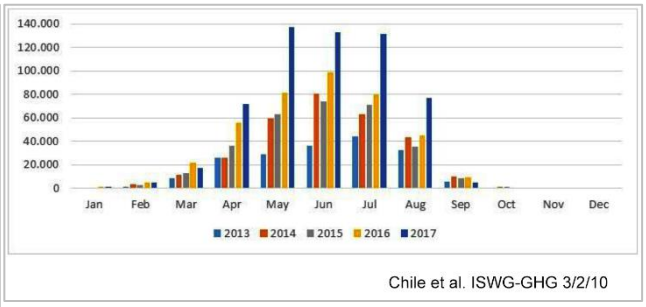

Figure 3: Peruvian avocado export months

Further technical clarifications

22 Speed optimization – under the official SEEMP guidelines "optimum speed means the speed at which the fuel used per tonne mile is at a minimum level for that voyage". In order to identify an optimum speed, reference should be made to the engine manufacturer's power/consumption curve and the ship's propeller curve.

23 Speed reduction – without additional qualification, this refers to each ship reducing their individual speeds by a pre-defined percentage compared to their own historical speeds.

24 Maximum speed – a target speed ceiling set on the basis of average fleet speed (per ship type/size) and individual ships with average speed above the target speed(s) slow down to the threshold level(s), while ships normally sailing slower than the target speed(s) are unaffected (see figure 4).

25 For the purpose of this proposal, speed regulation means the setting of maximum ship speeds *(see* paragraph 24) while taking account of the official IMO definition of speed optimization detailed in paragraph 22.

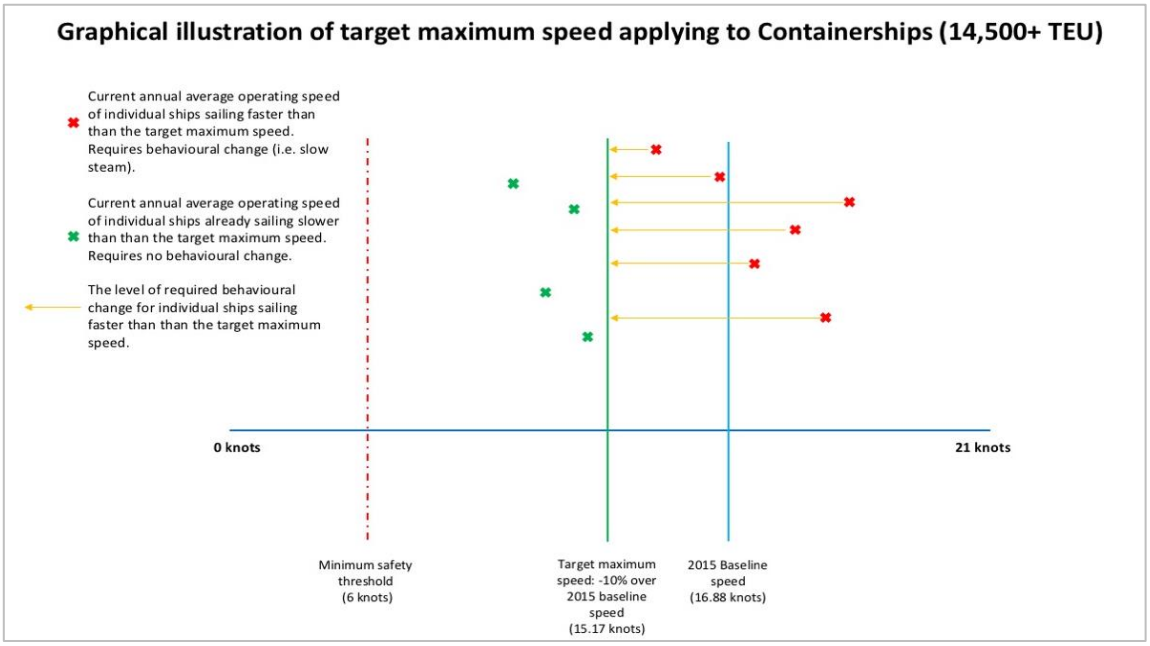

Figure 4: based on the example target speed thresholds (-10%) presented in table 1.

Action requested of ISWG-GHG 4

26 The Group is invited to consider the above proposals as part of its consideration of short-term measures to reduce GHG emissions and help meet the IMO 2030 carbon intensity target agreed in the Initial GHG Strategy.